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22801 7590 12/17/2009

LEE & HAYES, PLLC  
601 W. RIVERSIDE AVENUE  
SUITE 1400  
SPOKANE, WA 99201

EXAMINER

YUAN, KATHLEEN S

ART UNIT

PAPER NUMBER

2624

DATE MAILED: 12/17/2009

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,260	07/16/2003	Rong Xiao	MS1-1528US	9728

TITLE OF INVENTION: ROBUST MULTI-VIEW FACE DETECTION METHODS AND APPARATUSES

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	03/17/2010

**THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.**

**THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.**

### HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

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B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.**

## PART B - FEE(S) TRANSMITTAL

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**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

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22801 7590 12/17/2009

**LEE & HAYES, PLLC**  
**601 W. RIVERSIDE AVENUE**  
**SUITE 1400**  
**SPOKANE, WA 99201**

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### Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the **Mail Stop ISSUE FEE** address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)

(Signature)

(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,260	07/16/2003	Rong Xiao	MS1-1528US	9728

TITLE OF INVENTION: ROBUST MULTI-VIEW FACE DETECTION METHODS AND APPARATUSES

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nonprovisional	NO	\$1510	\$300	\$0	\$1810	03/17/2010
EXAMINER	ART UNIT	CLASS-SUBCLASS				
YUAN, KATHLEEN S	2624	382-159000				

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.  
 "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,  
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 \_\_\_\_\_  
2 \_\_\_\_\_  
3 \_\_\_\_\_

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent):  Individual  Corporation or other private group entity  Government

4a. The following fee(s) are submitted:

Issue Fee  
 Publication Fee (No small entity discount permitted)  
 Advance Order - # of Copies \_\_\_\_\_

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

A check is enclosed.  
 Payment by credit card. Form PTO-2038 is attached.  
 The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number \_\_\_\_\_ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.  b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

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Date \_\_\_\_\_

Typed or printed name \_\_\_\_\_

Registration No. \_\_\_\_\_

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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22801	7590	12/17/2009	EXAMINER	
LEE & HAYES, PLLC 601 W. RIVERSIDE AVENUE SUITE 1400 SPOKANE, WA 99201				YUAN, KATHLEEN S
ART UNIT		PAPER NUMBER		
2624				DATE MAILED: 12/17/2009

## Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)

(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 781 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 781 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/621,260	XIAO ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	KATHLEEN S. YUAN	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1.  This communication is responsive to an examiner initiated interview on 12/72009/.
2.  The allowed claim(s) is/are 1-19 and 22-70.
3.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a)  All    b)  Some\*    c)  None    of the:
    1.  Certified copies of the priority documents have been received.
    2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3.  Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4.  A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5.  CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a)  including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1)  hereto or 2)  to Paper No./Mail Date \_\_\_\_\_.
  - (b)  including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6.  DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1.  Notice of References Cited (PTO-892)
2.  Notice of Draftsperson's Patent Drawing Review (PTO-948)
3.  Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4.  Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5.  Notice of Informal Patent Application
6.  Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_.
7.  Examiner's Amendment/Comment
8.  Examiner's Statement of Reasons for Allowance
9.  Other \_\_\_\_\_.

### **EXAMINER'S AMENDMENT**

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Ms. Elizabeth Zehr on 11/19/2009.

2. Claims 1, 41 and 55 are allowable. Since all the dependent claims apply to the current independent claims, the withdrawn dependent claims are hereby rejoined. Because all claims previously withdrawn from consideration under 37 CFR 1.142 have been rejoined, **the restriction requirement as set forth in the Office action mailed on 2/22/2007 is hereby withdrawn**. In view of the withdrawal of the restriction requirement as to the rejoined inventions, applicant(s) are advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application. Once the restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. See *In re Ziegler*, 443 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.

The application has been amended as follows:

- a. Claim 3: "said plurality of portions" will be replaced by "the plurality of portions"
- b. Claim 4: the claim will be replaced by the following: "The method as recited in claim 2, further comprising processing the plurality of portions in the pre-filter stage, wherein the set of initial candidate portions are selected from the plurality of portions passed on at least one feature."
- c. Claim 5: "said feature" will be replaced by "the feature"
- d. Claim 6: "said pre-filter stage" and "a linear filter" will be replaced by "the pre-filter stage" and "the linear filter," respectively.
- e. Claim 7: "said linear filter" and "a weak learner" will be replaced by "the linear filter and "the weak learner", respectively.
- f. Claim 8: "said linear filter" and "a learning procedure" will be replaced by "the linear filter" and "the learning procedure", respectively.
- g. Claim 9: "said boosting chain" will be replaced by "the boosting chain".
- h. Claim 10: "said boosting chain" in line 1, "a plurality of boosting" in line 2 and "said boosting chain" in lines 2-3 will be replaced by "the boosting chain", "the plurality of boosting" and "the boosting chain", respectively.
- i. Claim 11: "said boosting chain" and "said boosting nodes" will be replaced by "the boosting chain" and "the boosting nodes", respectively.
- j. Claim 12: "said order" will be replaced by "the order".
- k. Claim 13: "said boosting chain" will be replaced by "the boosting chain"

- I. Claims 14, 49 and 63: "said boosting filter" will be replaced by "the boosting filter" and "an LSVM" will be replaced by "a Linear Support Vector Machine (LSVM)".
- m. Claim 15: "said LSVM" will be replaced by "the LSVM."
- n. Claim 16: "said global maximum" of lines 1 and 2 will be replaced with "the global maximum" Also, between "...i=1,...,n.," and "and wherein...", please insert "wherein  $\beta$  is a bias term,  $y_i$  is a label of sample  $x_i$ ,  $y_j$  is a label of sample  $x_j$ , and  $h(x_i)$  and  $h(x_j)$  are the weak learner".
- o. Claim 17: the claim will be replaced by "The method as recited in Claim 1, wherein the post-filter stage further includes a masking processing."
- p. Claim 18: the claim will be replaced by "The method as recited in Claim 1, wherein the image pre-processing process includes lighting correction processing."
- q. Claim 19: the claim will be replaced by "The method as recited in Claim 1, wherein the image pre-processing process includes histogram equalization processing."
- r. Claims 20 and 21 will be cancelled.
- s. Claim 22: "at least said final candidate portion" will be replaced by "the set of final candidate portions."
- t. Claim 23-25: "said information" and "said final candidate portion" will be replaced by "the information" and "the set of final candidate portions", respectively.

- u. Claim 27: "a simple decision stump" will be replaced by "the simple decision stump".
- v. Claims 28, 29 and 31: "feature-based" will be replaced with "feature based."
- w. Claim 30: "features" will be inserted between "...invariant" and "is added..." Also, "the size" and "said mirror invariant features" will be replaced with "a size" and "the mirror invariant features," respectively.
- x. Claim 32: "said face image data" will be replaced by "a face image data". Also, at the end of the claim, between the "data" and the period, please insert ", wherein the face image data is part of the set of digital image data"
- y. Claim 33: "said orientation" will be replaced by "the orientation."
- z. Claim 34: "Claim 33" and "said in-place estimation" will be replaced by "Claim 32" and "the in-place estimation", respectively.
- aa. Claim 35: the claim will be replaced by "The method as recited in Claim 34, wherein the up-right face detection identifies out-plane rotation variations of the face image data."
- bb. Claim 36: "said out-plane" will be replaced by "the out-plane".
- cc. Claim 37: "Claim 21" and "said SVM" will be replaced by "Claim 1" and "the SVM", respectively.
- dd. Claim 38: the claim will be replaced by "The method as recited in Claim 37, wherein the SVM filter process further includes performing wavelet

transformation to divide the set of digital image data into four sub-bands LL, HL, LH and HH.”

ee. Claim 39: The beginning part of the claim preceding the equation will be replaced with “The method as recited in Claim 38, wherein the SVM filter process reduces a redundancy of feature spaces using a second degree polynomial SVM Kernel:”. After the equation and before “wherein each...” please insert “where s is a serial of boosting classifiers, the superscript T is a dimensionality , and r is a constant.”

ff. Claim 42: “a digital image” and “said plurality of portions” will be replaced by “the digital image” and “the plurality of portions”, respectively.

gg. Claim 43: “Claim 41”, “said multiple stage”, “said set of initial” and “said plurality of portions” will be replaced by “Claim 42”, “the multiple stage”, “the set of initial” and “the plurality of portions”, respectively.

hh. Claim 44: “said feature” will be replaced by “the feature”.

ii. Claim 45: “said pre-filter stage” will be replaced by “the pre-filter stage”.

jj. Claim 46: “said boosting chain” will be replaced by “a boosting chain”.

kk. Claim 47: The claim will be replaced by “The computer-readable medium as recited in Claim 46, wherein the boosting chain includes the plurality of boosting chain nodes arranged in an order within the boosting chain, the boosting chain is trained using boosting classifiers corresponding to the boosting chain nodes, and each of the boosting chain nodes is constructed based on its preceding node in the order.”

ll. Claim 48: "said boosting chain" will be replaced with "the boosting chain."

mm. Claim 50: The claim will be replaced by "The computer-readable medium as recited in Claim 41, wherein the post-filter stage further includes a masking process, a lighting correction process and a histogram equalization process."

nn. Claim 52: "said face image data" will be replaced with "the face image data".

oo. Claim 53: "said SVM filter" and "said at least one" will be replaced by "the SVM filter" and "the at least one", respectively.

pp. Claim 54: "said plurality of sub-band" will be replaced by "the plurality of sub-band".

qq. Claim 55: please insert "including logic" between "memory having instructions" and "executable by the one" in line 3. Also, please insert "Perform a multiple stage face detection scheme to" in between "processors to" and "detect at least one" in line 4. Lastly, please replace "said set of" in line 14 and "said final" in lines 15-16 with "the set of" and "the final", respectively.

rr. Claim 56: "said logic", "a digital image" and "said plurality of portions" will be replaced by "the logic", "the digital image" and "the plurality of portions", respectively.

ss. Claim 57: "Claim 55", "said multiple stage", "said logic", "said set of initial" and "said plurality of portions" will be replaced by "Claim 56", "the multiple stage", "the logic", "the set of initial" and "the plurality of portions", respectively.

tt. Claim 58: "said feature" will be replaced by "the feature".

uu. Claim 59: "said pre-filter" and "said logic" will be replaced by "the pre-filter" and "the logic", respectively.

vv. Claims 60 and 62: "said boosting chain" will be replaced by "the boosting chain."

ww. Claim 61: the claim will be replaced by: "The apparatus as recited in Claim 60, wherein to provide the boosting chain the logic includes the plurality of boosting chain nodes and a plurality of boot strap functions arranged in an alternating order within the boosting chain, and wherein the boosting chain is trained using boosting classifiers corresponding to the boosting chain nodes, and wherein at least one sample weight associated with one of the plurality of boot strap functions is adjusted based on at least one classification error of a weak classifier associated with a previous node."

xx. Claim 64: "said post-filter" and "said logic" will be replaced by "the post-filter" and "the logic."

yy. Claim 65: the claim will be replaced by "The apparatus as recited in Claim 55, wherein the logic is further configured to output information associated with the set of final candidate portions."

zz. Claim 66: "said information" and "at least said final candidate portion" will be replaced by "the information" and "the set of final candidate portions", respectively.

aaa. Claims 67 and 70: "said logic" will be replaced by "the logic"

bbb. Claim 68: "said logic", "said face image data" in line 3, "said in-plane", "said up-right" and "said face image data" in line 5 will be replaced by "the logic", "the face image data", "the in-plane", "the up-right" and "the face image data", respectively.

ccc. Claim 69: "said SVM filter", "said logic" and "said at least one intermediate" will be replaced by "the SVM filter", "the logic" and "the at least one intermediate", respectively.

3. The following is an examiner's statement of reasons for allowance: Claim 1 is now allowable for the same reasons provided that claim 55 is allowable, as explained in the office action mailed 9/3/2009.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KATHLEEN S. YUAN whose telephone number is (571)272-2902. The examiner can normally be reached on Monday to Thursdays, 9 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (571)272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Bhavesh M Mehta/  
Supervisory Patent Examiner, Art Unit 2624

/Kathleen S Yuan/  
Examiner, Art Unit 2624

12/4/2009